Neighborhood Planning for Community Revitalization

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Grass Lake: Past, Present, and Future
Kenny Neighborhood Association

by Lanya E. Ross

January, 1996

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Abstract

Grass Lake is located in Southwestern Minneapolis in the Kenny Neighborhood. It is a 27 acre wetland, and although completely surrounded by an urban environment, it attracts a large diversity of wildlife.

Recent changes in Grass Lake have triggered considerable concern within the Kenny community. Much of this concern centers around the proposed reconstruction of Highway 62, which borders the southern edge of Grass Lake.

This report examines how past events have affected Grass Lake and other comparable urban water bodies in an attempt to determine how Grass Lake may respond to future events. The report also discusses some of the actions that can be taken by the Kenny Neighborhood to prevent any future damage to the lake.

Gathering information for this report, I reviewed several studies of both Grass Lake and other water bodies, interviewed a number of people, and researched newspaper and journal articles.

The Kenny Neighborhood has expressed how important this information is as they work with other communities, cities, and the Minnesota Department of Transportation to make informed decisions about projects impacting Grass Lake.

INTRODUCTION

"Transport policy has traditionally been played out in a context of elite politics where decision-makers are a combination of key politicians, top government bureaucrats, and commercial interest groups. This elite politics often encompasses several jurisdictional levels such as between federal and provincial levels, or between provincial and municipal levels. By contrast Parliament or legislatures, public interest advocates, and public opinions play a much diminished role in transport policy-making".

The quote above comes from Anton Turrittin at the Department of Sociology at York University, Toronto, Canada. The people of Toronto are also concerned with a topic that is of growing importance here in the United States: transportation decision-making.

This summer, I had the privilege of working with the Kenny Neighborhood Association in southwest Minneapolis on such an issue. Residents have been growing more and more concerned over the proposed reconstruction of Highway 62 due to its possible effects on their neighborhood and in particular, Grass Lake. Concern has recently been focused on issues of water quality, watershed drainage, and destruction of wildlife and habitat at Grass Lake.

Grass Lake is an urban wetland in the southeast corner of the neighborhood. It is has been home to over 100 bird

species, as well as a variety of mammals and vegetation.

Through letters, phone calls, and public education, Kenny residents and Grass Lake supporters have worked to remove the proposal for added construction of a frontage road along Highway 62 in the Minnesota Department of Transportation (MnDOT) plan to reconstruct Interstate 35W. The reconstruction plan has been submitted to the Federal Highway Department, but is 'on hold' on a state level due to lack of funding. In the interim, the Kenny Neighborhood has been compiling research and resources to make a final case for the preservation of Grass Lake and to stop the proposed highway expansion.

Where before there was "absolutely no data [on Grass Lake]", there is now water quality information from the Minnehaha Creek Watershed District (MCWD), vegetation information from the Department of Natural Resources (DNR), and bird foraging information from Colleen Allen, a graduate student at the University of Minnesota. Financial resources have also been granted by the Center for Regional and Urban Affairs (CURA), the Minnesota Office of Environmental Assistance (OEA), and the Minneapolis Foundation (Scott 6).

The community interest in Grass Lake and the data generated through the help of the organizations listed above attest to the value, both socially and ecologically of Grass Lake as an urban wetland.

This study examines the past, present, and possible future of Grass Lake, as well as that of other urban water bodies, in an attempt to understand how certain events, particularly road construction, have affected Grass Lake and how citizens can and have worked to prevent its deterioration.

AN OVERVIEW OF THE LAKES

Minneapolis has long been known as the City of Lakes. The lakes most often thought of are the Chain of Lakes: Brownie Lake, Cedar Lake, Lake of the Isles, Lake Calhoun, and Lake Harriet. The development of the City of Minneapolis has had a number of effects on these lakes including elimination of adjacent wetlands and natural drainage, and increases in the volume and velocity of polluted runoff. *Watershed* boundaries were expanded by the development. A watershed is the surrounding land area that drains into a lake, river, or river system.

The Chain of Lakes were originally created as the most recent glacial advance filled in an ancient river valley. As the ice melted, low spots of the new glacial soil collected water, and the lakes were created.

This same river valley was also the birthplace of more southern lakes, including Grass Lake, Richfield Lake, and Wood Lake. These lakes, while separate entities today, were once a single system. Another lake in the valley system is Diamond Lake to the east of Grass Lake.

Studying all of these urban wetlands together, we can gain a better understanding of the role Grass Lake plays as a wildlife habitat, a place for neighborhood recreation, and a system for storm water management.

In this study, I paid particular attention to Brownie Lake and Diamond Lake. They both offered examples of how lakes have reacted in the past to stresses that Grass Lake now faces.

Brownie Lake is the northernmost and smallest of the Chain of Lakes. Like Grass Lake, Brownie Lake does not receive much public attention as a recreational lake; however, it has been closely studied since the early 1900's. Two important issues at Brownie Lake have been: the effects of road salt on water quality, and the effects of size reduction of the lake due to road and railway construction. These subjects are important at Grass Lake as well.

To the east of Grass Lake is Diamond Lake, an urban lake that has changed rapidly in the past 50 years. It has been affected in many of the same ways as Grass Lake due to highway construction. Because of its location next to I-35W, Diamond Lake is a prime example to Kenny of the danger of neglecting erosion control during construction.

TECHNIQUES USED TO EVALUATE WETLANDS

There are a number of methods used to evaluate wetlands. It is important to remember that different factors are weighted differently depending on who is performing the evaluation and what their final goals are. Cheryl Miller at the Minneapolis chapter of the Audubon Society has said that a lack of a universally accepted wetlands rating system "will continue to plague us" as multi-party decisions are made about land use (Scott 8).

The Wetland Inventory Guidebook of 1991 includes four evaluation systems appropriate to Minnesota. They are:

1) *The MN Wetland Evaluation Methodology (WEM) for the North Central U.S., 1988.*

This method was created to help professionals quickly evaluate wetland functions. It includes evaluation of flood flow effects, water quality, wildlife, fish, shoreline anchoring, visual values, and special features.

Its shortcomings as an evaluation tool are its complexity and the amount of time needed to complete an evaluation.

2) *The Federal Manual for Identifying and Delineating Jurisdictional Wetlands, 1989.* This method is used solely to determine the jurisdictional wetlands for administering section 404 of the Clean Water Act, "Swampbuster" provisions, and delineating wetlands for the National Wetlands Inventory. It does not evaluate functional values and is considered by many to be a slow and complex procedure.

3) *The Habitat Evaluation Procedures (HEP).*

This was developed by the U.S. Fish and Wildlife Service to assess fish and wildlife habitat. It does not directly evaluate any other values.

4)*Wetland Evaluation Technique (WET).*

This was developed by the U.S. Department of Transportation, and the Federal Highway Administration to aid wetland evaluation for highway projects. Such an evaluation is needed for the completion of any Final Environmental Impact Statement, or FEIS. This document is required by the National Environmental Policy Act of 1969 (NEPA) in order to assure that no unnecessary environmental damage is done during any federally funded project. Similar laws were adopted by the states soon after.

Using WET, wetland functions are evaluated in terms of social significance, effectiveness, and opportunities.

The specific functions evaluated are: ground water recharge and discharge, flood-flow alteration, shoreline stabilization, sediment and toxicant retention, nutrient removal and transformation, production export, aquatic diversity and abundance, wildlife diversity and abundance for breeding, wildlife diversity and abundance for migration and wintering, recreation and uniqueness and heritage (Marble 3).

Although it is widely used by many agencies and organizations (including the Minnesota Department of Transportation) because it is so quick, it is important to realize that WET has not been validated with experimental or empirical studies (Marble 4).

Colleen Allen, a graduate student from the University of Minnesota, has been working with the Kenny Neighborhood to develop another method to evaluate wetlands through the monitoring of bird species. She is conducting a bird foraging study of Grass Lake to assess the health and the bio-diversity of the wetland. This will be used as a marker of the quality of Grass Lake as a natural habitat and serve as a benchmark against which the effects of environmentally harmful actions may be measured. She has documented the

presence of 53 bird species at Grass Lake this summer alone.

Yet another method of wetland evaluation was used by Frank Lupi, Jr., Theodore Graham-Tomasi, and Steven J. Taff of the Department of Agricultural and Applied Economics at the University of Minnesota. Their study is entitled *A Hedonic Approach to Urban Wetland Valuation*, and it is of interest to the Kenny Neighborhood because the Grass Lake watershed is 90% residential. The study examines the effects that wetlands have on the property value of nearby homes.

"Statistical techniques were used to estimate the relationship between residential property values and property characteristics, especially lake and wetland characteristics. The analysis was applied to a set of property characteristics of the over 18,000 residential properties sold in Ramsey county during 1987-89". Their report concluded that the "total protected wetland acres per section has a significantly positive effect on the equilibrium price of residential property in Ramsey County" (Lupi, et al 1).

This effect can be seen in the Kenny Neighborhood as the houses around Grass Lake hold their value with the rest of the community, even though they are adjacent a major highway and now threatened by its expansion.

GRASS LAKE: PAST

The historical and social value of a wetland cannot be neglected in a complete evaluation. Some evaluation methodologies address those values, but it is often difficult and time consuming to find such historical and social information. Grass Lake, fortunately, has been important enough to its neighbors to warrant such study.

In 1991, Robert Gottschalk completed the first historical study of Grass Lake.

Grass Lake is a glacial creation. According to Robert Gottschalk in his study, Grass Lake: An Urban Wetland's Life History, "Grass Lake was a low spot in what used to be a drainage river of Glacial Lake Agassiz. This same ancient drainageway also flowed over what are now the Chain of Lakes, Wood Lake, Richfield Lake, and Diamond Lake" (Gottschalk 1).

In 1839 a map was made of the Fort Snelling area by Lieutenant James I. Thompson. On it, Grass Lake and Richfield Lake were a single body of water. It was approximately the same size as Wood Lake, and these two large lakes were hydrologically connected (see figure 1).

In 1930 the large Grass Lake was still intact, as seen on a map done for the Board of Park Commissioners (see figure 2).

In 1937, aerial photos were first taken of Grass Lake. In these photos, Grass Lake appeared as nothing more than a cultivated field. The reason for the lack of water is unknown, but it may have been due to drought or to artificial drainage of the field by the current property owner (Gottschalk).

Aerial photos from 1951 showed 7.8 acres of open water. In 1956 the area of open water increased dramatically to 24.7 acres. This was after the construction of Highway 62 and an intense urbanization of the area (Gottschalk) (see figure 3).

The construction of Highway 62 split Grass Lake into two new lakes: Grass Lake and Richfield Lake. Grass Lake was dredged to provide material to build the new road on. This created a deeper, open water lake. The two lakes were then joined by a pipe to preserve their hydrologic integrity. Water from the new highway directly entered Grass Lake through surface runoff and the new storm sewer (Gottschalk 1).

The highway also opened the area up for more urbanization. Says Robert Gottschalk, "This brought with it many new factors that impacted the lake. It greatly increased the size of the watershed area [by expanding sewer pipes beyond the natural watershed boundaries] and expanded the efficiency of the storm sewer system that carried water to the lake."

GRASS LAKE: PRESENT

Grass Lake is a DNR protected water body (681W on the inventory map) and is under the jurisdiction of the Minnehaha Creek Watershed District. The land around the lake is owned by the City of Minneapolis and is under the management of Public Works.

Today, Grass Lake is a type 3/4/5 (shallow marsh/deep marsh/open water) wetland located in the Kenny Neighborhood in Minneapolis, Minnesota. It has a surface area of 27 acres and an average depth of 2.5 feet (George Apr. 26).

Grass Lake drains approximately 386 acres, over 4% of which is the highway surface of Highway 62. 90% of the watershed is residential area, 4% is commercial, and only 2% is open land (George Apr. 26) (see figure 4).

It is important to realize that the amount of water that enters Grass Lake from these land use areas is not simply the result of how much land is present. It is strongly impacted by what type of land it is: how much vegetation is present, what type of soils are present, etc.. For example, almost all the rain that lands on pavement will enter the lake, whereas a lesser amount of rain landing on a lawn will enter the lake because it is absorbed by the soil and used by plants. Thus, the 4.3% of highway surface may contribute

much more than 4% of the water (and pollution) entering Grass Lake.

Water also enters Grass Lake through precipitation and runoff into sewer pipes. Nine *grit chambers* were constructed in 1995 at the ends of these pipes to filter out debris such as leaves, sand and gravel, and other garbage.

The water entering Grass Lake eventually leaves through evaporation or, if the water is high enough, by draining south through a pipe to Richfield Lake.

Grass Lake is a very dynamic water body. It has undergone many natural and human induced changes. Recently, many Kenny neighborhood residents have become concerned that many of these changes have become dangerously accelerated.

In 1994 nearly all of the cattails disappeared from Grass Lake. This lack of habitat was followed by a decrease in wildlife populations, including very prominent populations of Muskrat, Forster's Terns, and Yellow-headed and Red-winged Blackbirds.

Colleen Allen's study, has documented bird species she has found at Grass Lake. Although a larger diversity of species were sited at Grass Lake than at Oxboro Lake, a control site of comparable size and surrounding environment in Bloomington, Minnesota; there are still fewer birds at Grass Lake than in previous years, according to residents. Of notable character are the Forster's Terns, for which Grass Lake is designated a high priority lake by the DNR. This past summer Colleen only sited seven terns and one egg. This compares to the year before, when Tom Ramsay and Nancy Goetzinger, Kenny residents counted 70 fledglings.

Many residents and organizations are questioning the reasons for the sudden decline in wildlife populations. Some suggestions are high water levels, an unsustainably high muskrat population, the addition of chlorinated water to the lake, erosion due to road reconstruction, and the noise of construction.

"Great Plains wetlands are extremely dynamic, and the presence of stopover resources during migration are highly unpredictable. Shorebirds are opportunistic in habitat-use patterns and are able to track suitable resources within wetland complexes. When local conditions are unfavorable, however, birds may be constrained in their abilities to find timely resources, especially if fat reserves are insufficient," write Susan Skagen and Fritz Knopf at the U.S. Fish and Wildlife Service of Colorado.

What was once a "jewel of a wetland" and teaming with wildlife may be disappearing. This is a growing concern of wilderness lovers everywhere, be they Minneapolis residents that live around the lake, or recent visitors from

Japan who made Grass Lake their first stop in order to view the birds.

Tom Ramsay and Nancy Goetzinger, neighborhood residents who have observed Grass Lake for thirteen years and have traveled North America photographing wetlands, have voiced their concern for the causes of Grass Lake's rapid deterioration. Foremost among the problems is the possibility of future road construction. They submitted a complete response to MnDOT's Final Environmental Impact Statement (FEIS), documenting the changes they have seen in Grass Lake and requesting that more study be done to determine what effects highway construction has had and will have on Grass Lake.

For them and for many others, the question is not "will future highway construction affect Grass Lake"; but "how can we prevent Grass Lake from being damaged by future highway construction"?

This question stemmed from concern over recent reconstruction of the ramp for State Highway 121 by the Minnesota Department of Transportation (MnDOT).

In April 1994, MnDOT began construction on the 121 ramp at the southeast corner of the lake. This work was begun without a permit from the MCWD and without erosion control measures. When confronted about this by the MCWD, MnDOT initially denied their need for a local permit but finally erected the erosion control needed to prevent *non-point source pollution* into the lake.

Sand, silt, gravel, leaves, and pollutants in runoff are all examples of non-point source pollution. This type of pollution is not discharged from a single point, and has been called the "hidden poison" by some environmentalists.

Many of the erosion control devices, such as silt fences, were not properly maintained throughout the project. This resulted in very large amount of *suspended sediment* in the lake. This lack of erosion control has been documented by residents and the photos are included in Tom and Nancy's response to the FEIS.

A study done by Richard Sojda of the U.S. Fish and Wildlife Service in Fort Collins, CO, states that "Cattails can produce seeds and contribute to the seed bank at all marsh stages, but recruitment occurs only during the dry stage. Light in combination with other environmental factors is critical to germination, and 13 mm of water filters out enough light to prevent germination."

When Jeff Lee, Limnologist for the Minneapolis Park Board, studied Grass Lake in September of 1994 he had a water clarity reading, or *secchi disc* reading, of 0.0 feet. Suspended particles in the water were blocking almost all of the light (Lee).

Highway construction is not the only factor believed to be involved in the sudden decline in lake quality. Between June and October of 1994, the city of Minneapolis found it necessary to clean out some drinking water pipes in the Kenny Neighborhood (George Jul. 31). In order to do this they discharged water continuously at approximately 100 gallons per minute with a chlorine concentration of approximately 1.5 parts per billion. This is approximately 1.8 gallons of chlorine per day. The total volume of water discharged in those five months was approximately 22.03 million gallons. The total volume of Grass Lake itself is only 17 million gallons (George).

"It is known by those who have freshwater aquariums that, if not properly treated, the chlorine content of drinking water will kill freshwater fish. In 1994, the City of Minneapolis pumped an estimated 22 million gallons of chlorinated water into Grass Lake, " wrote Kenny resident Tom Ramsay in a letter to the MCWD in 1995.

One of the constant threats of increasing urbanization is *cultural eutrophication.* This is the accelerated aging process due to human activities which fertilizes lakes with nutrients. This is occurring at Grass Lake. One result of this is the smell which some residents, among them Beverly Foster, said was stronger this year than it has been in the past. Another result is the algae blooms which cloud the water and limit the amount of sunlight that can penetrate the lake surface.

GRASS LAKE: FUTURE

Reconstruction of Interstate 35W and Highway 62

In 1995, MnDOT completed the FEIS for their proposed project to expand I-35W. The project, initiated in 1986, proposes the reconstruction of eighteen miles of highway from Washington Avenue in Minneapolis to the junction of I-35W and I-35E in Burnsville.

Also included in the final plan is the construction of a frontage road along Highway 62 from Penn Avenue to Portland Avenue. This portion of the plan was not mentioned in the Draft Environmental Impact Statement, and hence never received public scrutiny nor comment. Currently there are 16.4 acres of paved highway surface in the Grass Lake watershed. This is 4.3% of the Grass Lake watershed. If the proposed frontage road is constructed by MnDOT, 3.7 additional acres of highway would be built within the Grass Lake Watershed, amounting to 20.1 acres, or 5.2% of the total watershed acreage. This figure does not take into consideration all of the other paved surface in the watershed.

If the proposed frontage road is constructed, it will also fill in 0.1 acres of

Grass Lake (increasing water levels and affecting vegetation type), remove 38 homes from the Kenny Neighborhood, and replace the yards, which currently serve Grass Lake as a vegetative buffer from the highway, with paved surface (FEIS).

The increased amount of water running off the frontage road would enter Grass Lake through a storm pipe in the southwest corner of the lake. The FEIS states that a detention basin would be constructed at this location to purify incoming water. According to a study done by the US fish and Wildlife service, however, this detention pond may not assist in decontaminating the water to a safe level (see page 13, paragraphs 2, 3, 4).

Currently there is no data about how much water enters the lake due to highway runoff, or how much pollution is contributed to Grass Lake by this water. No tests have been done at Grass Lake for constituents normally found in highway runoff or on amounts of heavy metals in the lake sediments because of the high cost of such testing. Such testing is important because as the amount of water entering the lake from the highway increases, the level of pollution entering the lake increase as well.

Concern over increased pollution levels very commonly accompanies highway construction. Exactly how much of an increase will occur, however, is not an easy question to answer.

"Even though there is some evidence that the aggregate contribution to water pollution might be significant, the fact that transportation results in very dispersed sources of pollution has rendered problematic attempts to address the problem" (Miller 49).

Some common water pollutants from highway use include asbestos, particulate matter (such as rubber), road salts and other deicing chemicals, discarded engine coolant, petroleum residuals, various detergents, and heavy metals such as lead, nickel, cadmium, copper, and zinc (Miller 49) (see figure 5).

According to the Final Environmental Impact Statement, the expansion of I-35W is being done "1) to provide a multi-modal regional transportation facility which serves the diversity of person-trip travel demands as well as the movement of goods in the I-35W corridor, 2) to correct geometric and operational deficiencies that increase congestion, cause accidents, increase air and noise pollution, and waste energy, and 3) to address the deteriorating condition of the facility."

This project is dependent on sources of funding from the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) which provides funds for transportation projects which include

transit alternatives, the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA). The FEIS states that "construction is unscheduled and unlikely to occur before 2000 and, therefore, future federal legislation on transportation funding may impact this project" (FEIS 1-5).

The Draft EIS prepared by MnDOT for the I-35W project stated that the impacts on Grass Lake would be relatively minor. According to their assessment of Grass Lake using WET, Grass Lake has the lowest wildlife habitat rating of any of the lakes in the I-35W corridor. It received a rating of 55.6 out of a rank of 100. The FEIS states, "There are no anticipated adverse impacts on fish, wildlife or threatened and endangered species associated with the Preferred Alternative" (FEIS 1-20).

According to MnDOT, the reconstruction would be done in sections to reduce the amount of impact to any given area. Some anticipated minor effects include: a minor change in phosphorus and heavy metal mass loading in the lakes, no negative impacts on wildlife, and temporary increases in erosion (FEIS 1-20).

To prevent major problems, detention basins would be constructed where needed, and any wetland loss would be mitigated at a 2 to 1 ratio. The mitigation site is located near Belle Plaine, Minnesota, forty-five miles from the City of Minneapolis (FEIS 7-18).

753 groups and individuals made comments concerning the MnDOT Draft EIS, which was an assessment of the impacts on the natural and physical environment caused by the I-35W reconstruction options. Although the Highway 62 frontage road wasn't one of the options presented, and is more invasive to Grass Lake than the options that *were* presented, many people still expressed particular concern for the state of Grass Lake, including the MCWD and the Minneapolis Park and Recreation Board.

Concerns included: increased flooding at Grass Lake, the surprisingly low wildlife rating of the lake, possible destruction of the wildlife, and the plan to connect Grass Lake by pipeline to Richfield and Wood Lakes and to the Minnesota River.

Another concern was the quality of the assessment itself. As Jeff Lee, of the Minneapolis Park and Recreation Board, stated on Nov. 21, 1991, "The present study is deficient: the study design is inadequate and the conclusions misleading. Further work needs to be directed at mitigation measures that more fully protect the affected water bodies from present and proposed runoff. Acceptance of existing water quality as the status quo is no longer desirable. The I-35W reconstruction should be viewed

as an opportunity to institute water quality protection measures that have been previously neglected. . . the study failed to address the episodic impact of spring melt water inputs of salt and road abrasives on biota. . . Potentially toxic levels of metals and organic pollutants in snow melt have been documented by numerous researchers. All the water bodies in the study area have long retention times and thus would be expected to retain a large percentage of the inputs" (I-35W EIS Water Resources Special Study).

In response to the FEIS, another very powerful comment came from Tom Ramsay and Nancy Goetzinger who address both ecological and social needs are addressed. They conclude that "the agency [MnDOT] has been largely unresponsive to the wishes of the citizens in the neighborhoods to be impacted by its proposed roadway expansion". A copy of their report is available from the Kenny Neighborhood Association.

Proposed pipeline from Grass, Richfield, and Wood Lakes to the Minnesota River

Residents in the Kenny Neighborhood are also concerned about MnDOT's plan to connect Grass Lake, Richfield Lake, and Wood Lake through a pipe system, and then to drain their water down the Interstate 494 storm tunnel to the Minnesota River.

Residents understand that because Grass Lake is at the top of the chain of lakes, this plan may have little effect on Grass Lake. They are concerned, however, that pollutants from Grass Lake will flow downstream to the highly valued Wood Lake and on into the Minnesota River which is already fighting pollution overload.

Grass and Richfield Lakes are presently connected by a pipe that drains water from Grass Lake to Richfield Lake. The construction of the new pipe is planned to run under 66th street connecting Richfield and Wood Lakes. Another pipe will be constructed from Wood Lake to the 77th street project where a pipe has already been built by the Federal Highway Administration. Here, it is proposed that the water will be pumped up a five foot rise to meet the pipe that drains Highway 494. Flood water from Grass, Richfield, and Wood Lakes will flow down this pipe to the Minnesota River (see figure 6).

The City of Richfield, which has been searching for ways to stop the heavy flooding that occurs around Richfield Lake, supports this proposal. This plan offers them a way to get rid of water that is running off of the increasing amount of *impervious surface* in the watershed. This impervious surface, usually pavement, stops water from

being absorbed by the ground. Instead it is forced to flow over the pavement and into storm tunnels which lead to lakes and streams (Eastling). Flood water in Richfield would not pool in Richfield Lake causing flooding, according to the plan. But the water *would* have to pool there until Interstate 494 had been completely drained of flood water.

The Wood Lake Nature Center, which would then be receiving water from Richfield and Grass Lakes, sees the benefits of this new system as well. According to the Center, this pipe means that in dry years water levels in Wood Lake can be augmented by Richfield Lake water. It would also be able to get flood water out of Wood Lake sooner, preventing the damage the lake suffers during both droughts and floods. The Wood Lake Nature Center also believes that water quality in Wood Lake will improve because the water entering the lake will be cleaner after flowing first through Grass and Richfield Lakes (Eastling).

A study completed by the U.S. Fish and Wildlife Service in 1994, however, examined pollutant loading from storm water in water bodies in Bloomington, MN. The storm water retention ponds studies are those in the Pond C watershed, including Wilson Pond, Smith Park Pond, Wright's Pond, and Pond C. The water from these ponds flows into Long Meadow Lake and then into the Minnesota River.

Little correlation was found between the number of storm water treatment ponds and a reduction in many heavy metals related to highway use. This would mean that, contrary to Richfield engineer's predictions, the water quality in Wood Lake may not improve. In fact, water quality could very well decrease as polluted contaminants are carried downstream (U.S. Fish and Wildlife Service).

It is important to look at the reasons why water quality did not improve. The U.S. Fish and Wildlife study concluded, "the development of an inlet to outlet bottom current in Pond C during larger runoff events was sufficiently strong to cause scouring of fine bottom sediments accumulated during previous minor runoff events".

This statement addresses two important facts that relate to Grass Lake. First, it addresses the importance of detention basin design in pollutant reduction. A basin that is poorly designed, like Pond C, will simply hold the sediments until a strong current sweeps them downstream. This is very similar to what happens inside grit chambers (such as those around Grass Lake) when they are not cleaned frequently enough. It could also happen with the proposed detention ponds

around Grass Lake if they aren't constructed properly.

Second, it draws attention to the fact that finer sediments, such as silts and clays, are significantly more contaminated than heavier sands and gravels. These fine sediments also need the most time to settle out (which many never completely do) and are the easiest to re-mix and transport downstream to other bodies of water. Detention basins, constructed in an attempt to collect polluted sediments, only collect the heavier, less polluted sediments (see figure 7).

MnDOT has committed $350,000 toward the construction of the pipeline between Richfield Lake and Wood lake (Eastling, meeting).

The Minnesota Department of Transportation benefits from this project because, until they can deal with excess flood water generated by the increased paved surface that goes along with highway expansion, they will not be granted a permit by the MCWD to proceed with their project to reconstruct I-35W and Highway 62.

With a pipeline connecting all of these water bodies to the Minnesota River, Grass, Richfield, and Wood Lakes become a vital part of MnDOT's storm water management plan.

But is this an effective long term plan? Storm water detention/retention ponds, something that Grass Lake is fast on its way to becoming, have an expected life of 15-25 years. They then need to have all the collected sediment dredged out at a cost of anywhere from $3 - $15 per cubic yard (Brasch).

Before the pipeline project can be started, permits are needed from DNR and MCWD. DNR approved a permit early this summer that allows an outlet to be put in at Wood Lake.

Tom Ramsay asked the MCWD to address a series of questions concerning the pipeline before approving a permit for it. Two pertinent issues/questions about the proposed pipeline are:

1) Who will have future jurisdiction over Grass Lake?

2) How will this pipeline increase the ease with which MnDOT can add impervious surface in the vicinity of Grass, Richfield, and Wood Lakes, thereby adding runoff?

Currently, Grass Lake remains under the jurisdiction of MCWD. It is possible, though, once the lakes are linked by pipes, for any citizen or organization to petition the Board of Water and Soil Resources to have Grass Lake Watershed added to the Richfield Burnsville Water Management Organization.

If Grass Lake *is* put into the RBWMO, the engineers of Richfield and Burnsville will have control over the outlet pipe that leads from Grass Lake to Richfield Lake. This means that they would be able to make decisions about

how high or low the outlet could be, as well as when and if it should be closed. All of these decisions would ultimately need to be okayed by DNR, whose water quality standards are lower than those of the Minnehaha Creek Watershed District. Even minor changes in water level, however, can affect wildlife quality.

Tom Ramsay, addressing the Watershed District, asked that jurisdiction over Grass Lake be maintained under one of the three following alternatives:

a) Grass Lake stays with MCWD

b) If Grass Lake is transferred to a different watershed district, a Governing Board for Grass Lake should be created with veto rights by the Board over alterations to Grass Lake

c) A new watershed district is formed that encompasses Grass Lake, Richfield Lake, and Wood Lake.

The second question posed, "how will the pipeline affect the ease with which MnDOT can add impervious surface?" is an area of key concern for the Kenny Neighborhood.

Peter R. Willenbring, engineer for the City of Richfield, responded to the question by noting, "it will reduce the need for any activities within the Richfield Lake Watershed to address problems related to increase in runoff volume as part of development".

Additionally, the City of Richfield is primarily opposed to the expansion of the highway due to the management of storm water runoff. If MnDOT solves this problem with the pipeline, they will remove the reason for Richfield's opposition to the proposed plan.

DIAMOND LAKE

In order to understand what may happen at Grass Lake, it is helpful to look at the results of other road construction projects on wetland life. Diamond Lake is just such an example. Diamond Lake is located in southwest Minneapolis. It is currently bordered by Diamond Lake Road to the north and I-35W to the west.

The earliest study of Diamond Lake was done in 1953 by Hennepin County Fisheries Research unit. At this time, the area of the lake was 115 acres and the maximum depth was 4.5 feet (E. A.. Hickok and Associates). The water was a green color and the secchi disc reading (which reads water clarity) was 4.5 feet. Aquatic plants were abundant throughout the lake. The most common were bulrush, bur-reed, blue-joint arrow-head, white waterlily, bushy pond weed, duckweed, and coontail. There were also six species of fish present (E. A.. Hickok and Associates).

In 1953 the only evidence of pollution was "some siltation noted at entrance of storm sewers" of which there were two (E. A.. Hickok and Associates).

In 1986 another study was done for the City of Minneapolis by the Department of Natural Resources. It concluded that Diamond Lake had a surface area of only 60 acres, a maximum depth of 5.8 feet , and a rooted aquatic plant population that encompassed the entire basin. The vegetation type had matured from that of the earlier study, and represented eutrophication of the lake (E. A.. Hickok and Associates).

The drastic changes in the lake between 1953 and 1986 were due to the construction of Pearl Park in the late 1950's. The depth increase (1.3 feet) was caused by dredging the lake in order to provide soil on which to build the re-routed Diamond Lake Road. This road was then used to transport fill to the area now known as Pearl Park. The area filled was the northern end of Diamond Lake.

Together, the construction of Diamond Lake Road and Pearl Park resulted in a loss of 55 acres of the surface area of Diamond Lake.

The 1986 study was completed by the DNR to determine the costs and benefits of restoring Diamond Lake to pre-park appearance. The study claimed that Diamond Lake was currently healthy and supporting the wildlife that it contained. It did not, however, take into account the 'historical' health of the lake, or what Diamond Lake was like before the construction of Pearl Park and I-35W.

Jim Spensley, a Minneapolis resident who served on the Minnehaha Creek Watershed District for 9 years and has been concerned with Diamond Lake for 30 years, states that a former Diamond Lake resident, Marvin Burrell, studied the lake after the construction of Pearl Park and found depths of up to 12 feet (approximately 5 feet deeper than found by the 1986 study). This difference is accounted for by the 5.5 feet of sedimentation composed of sand (most likely from winter road runoff) and organic matter from the streets that was measured in the 1986 study.

Jim Spensley argues that the construction of I-35W also changed the habitat and wildlife at Diamond Lake. Unfortunately, as he says, "there's no species data proving me right. Of course, there's none to prove me wrong either".

Spensley was living on the lake when I-35 was constructed, a project for which no erosion control was used. During the construction there was a heavy storm that lasted approximately two days. In these two days, up to 700 cubic yards of soil washed into the lake. This "temporary erosion" had a devastating impact on the quality of Diamond Lake.

Construction is by no means the only activity damaging Diamond Lake. Today, eight storm sewers carry water, pollution, and sediments from the 680 acre Diamond Lake watershed into the lake with little or no retention or

treatment. The analysis of the hydrologic loading and the nutrient concentrations measured going into the lake indicates that an excess of 400 pounds/year of phosphorous is delivered to Diamond Lake from its watershed. This converts to an aerial loading of approximately 20 mg/m squared. This amount is double the commonly accepted phosphorous loading of 10 mg/m squared (E. A.. Hickok and Associates).

Based on a combination of water quality monitoring and non-point source pollution modeling, it was estimated that the annual sediment deposition in Diamond Lake would be approximately 590,000 pounds/year. This would have a volume of slightly more than 6000 cubic feet per year. (E. A.. Hickok and Associates, 1986). Jeff Lee has written that "previous studies have that 67% of the current coarse sediment load to Diamond Lake is delivered via I-35W runoff (Lee, 1991). This shows the enormous amount of pollution entering Diamond Lake from the highway. It also raises the question about how much pollution is entering Grass Lake from Highway 62 and T.H. 121.

BROWNIE LAKE

Brownie Lake is the northernmost and smallest of the Chain of Lakes. Like Grass Lake, Brownie Lake does not receive large public attention as a recreational lake, but it has been closely studied since the early 1900's. Two important subjects that Brownie Lake bring to light are the effects of road salt, and the effects of size reduction due to construction.

Brownie Lake has a surface area of 18 acres and drains 313.4 acres. It is perched above the water table and receives no ground water inflow. In 1867 the area of the lake was reduced by 34% by the construction of a railroad embankment. It was connected to Cedar Lake in 1917 with a canal that lowered the lake level by 9 feet and further reduced the surface area by 56%. Brownie Lake has been receiving urban runoff since 1920. It has been *meromictic*, experiencing a reduction of internal cycling, since 1925. Sediment accumulation rates increased at this time also (Minneapolis Park and Recreation Board).

In 1933 well water was first pumped into Brownie Lake in an attempt to maintain lake levels throughout the Chain of Lakes. In 1957 a pipe line was constructed from Brownie Lake to Basset Creek for additional water level support. Mississippi River water was also used.

In 1971 Brownie Lake still appeared to be meromictic, with only the upper few meters circulating, the lower part being stabilized by a high salt content. This suggested that de-icing salts from Highway 12 and nearby parking

areas were the cause (Minneapolis Park and Recreation Board).

In 1984, Swain investigated Brownie Lake with regard to blue-green algae. He concluded that the low algal count was caused by a lack of iron due to reduced internal cycling (meromixis). Heavy use of road salt use had always been considered responsible for Brownie Lake's meromixis, but Swain found evidence that it resulted from the 1917 construction that reduced the lake surface (Minneapolis Park and Recreation Board).

The story of Brownie Lake is striking because of similarities to Grass Lake and the dramatic changes it underwent in the hands of humankind. Its history raises a number of interesting questions that may be applied to Grass Lake as well.

RECOMMENDATIONS

In order to properly manage the resources at Grass Lake more needs to be done. Some topics that need further study are:

Unanswered Questions.

Many questions concerning the impact of the Highway 62 on Grass Lake are still unanswered:

How much of the water, percentage and actual volume, entering Grass Lake comes from the Highway?

What pollutants can be found in water entering Grass Lake from the highway?

In what amounts are these pollutants in Grass Lake's water and soil?

What effects might these pollutants have on the wildlife at Grass Lake?

Future Research.

Ongoing research at Grass Lake is important in determining what reactions Grass Lake has to future events such as construction, flooding, drought, etc..

Kenny residents feel it is important to know more about the life cycle of cattails in healthy wetlands, the impacts of heavy metals on wetland habitat, and the effects that reshaping (dredging, island creation, etc.) would have on Grass Lake.

Continuation of Colleen Allen's bird foraging study will enable neighbors to establish a baseline of Grass Lake bird species and habitat. This can be used in future years to determine the quality of the wildlife in order to see if help is needed.

Monitoring the depth and area of Grass Lake and noting the changes to the wildlife and water quality will allow water level to be more effectively managed.

It is also important to keep track of changes in land use in the Grass Lake watershed, as well as any events that may

affect water quality, quantity, and wildlife habitat.

Along with this, it is important to monitor the new pollution prevention devices around Grass Lake, such as grit chambers. These devises only work if they are being cleaned and maintained.

Researching buffer zones may also be helpful for Grass Lake. Buffer zones are defined as green area surrounding a water body. This area of vegetation is capable of filtering pollutants out of runoff and preserving the quality of water in a lake, stream, or wetland.

Community Action and Education.

The neighborhood may want to research ways in which other communities have protected their wetlands. Working with other organizations would encourage the passage of wetland regulation revisions that will protect Grass Lake and other wetlands on a neighborhood scale.

Also, since 90% of drainage into Grass Lake is from residential area, it is very important that neighbors be informed of how they can affect the quality of Grass Lake. Educational actions have included stenciling storm water sewers and a "bag you autumn leaf" campaign. Future action will involve a community watershed clean-up, a campaign to reduce automobile use in the area, and a youth watershed stewardship project. To get involved in this, contact Sarah Linnes-Robinson at the Kenny Office.

Legislation.

The state of future wetland legislation is still in limbo. Future legislation would have to be researched. Two specific subjects the neighborhood has suggested are: the creation of an independent watershed containing Grass, Richfield, and Wood lakes; and making Grass Lake part of the Chain of Lakes sub-watershed.

There are sources of legislative information at the KNA office. This includes the booklet Wetland Regulations in Minnesota put together by Cheryl Miller and Nancy Goetzinger with the Audubon society.

In March of 1991, John Helland, a Legislative Analyst for House Research, compiled a list of questions and answers about Minnesota Wetlands. This included a list of wetland protection programs in Minnesota.

John Jaschke at the Board of Water and Soil Resources has re-written the Wetland Conservation Act including the changes made during the last legislative session. This is one draft that may be passed in the legislature in 1996.

CONCLUSION

Despite the fact that Grass Lake receives the runoff from hundreds of yards, fertilizers, and the storm water from one of the most heavily used highways in the Twin Cities, it still has an amazingly high level of wildlife for an urban wet land.

The wildlife at Grass Lake has changed with the changing water quality, but it has not changed for the better. With more pollutants, it will eventually die, leaving a very unattractive storm water treatment pond in the middle of a residential neighborhood.

It will take community involvement to stop any further decline. The expansion of Highway 62 will not only bring down property values in the Kenny neighborhood, it will inevitably have a negative effect on Grass Lake, one of the redeeming factors in property value in the neighborhood.

Kenny Neighborhood is continuing to try to stop the evolution of Grass Lake from a "jewel of a wetland" into a storm water detention pond. They are one example of a community working to have a say in urban decision-making regarding wetlands.

This paper lightly skims the surface, so to speak, of the action going on at Grass Lake. To find out more about this issue, please contact the Kenny Neighborhood Association office at 5516 Lyndale Ave. South in Minneapolis.The phone number is (612) 827-9438. All of my resources are on file there, as is almost all of the documented Grass Lake history .

A great part of the accomplishments made at Grass Lake became possible because of shared information. If you have any information that would be helpful to the Kenny Neighborhood, please feel free to pass it on.

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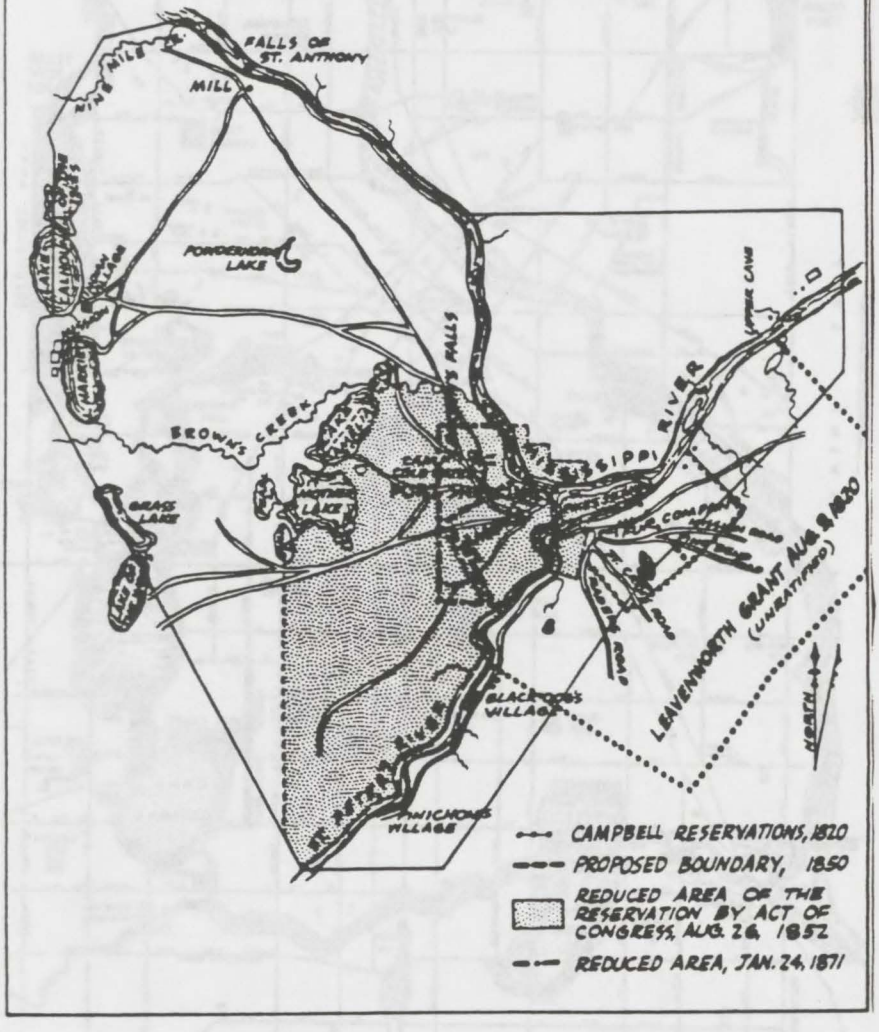
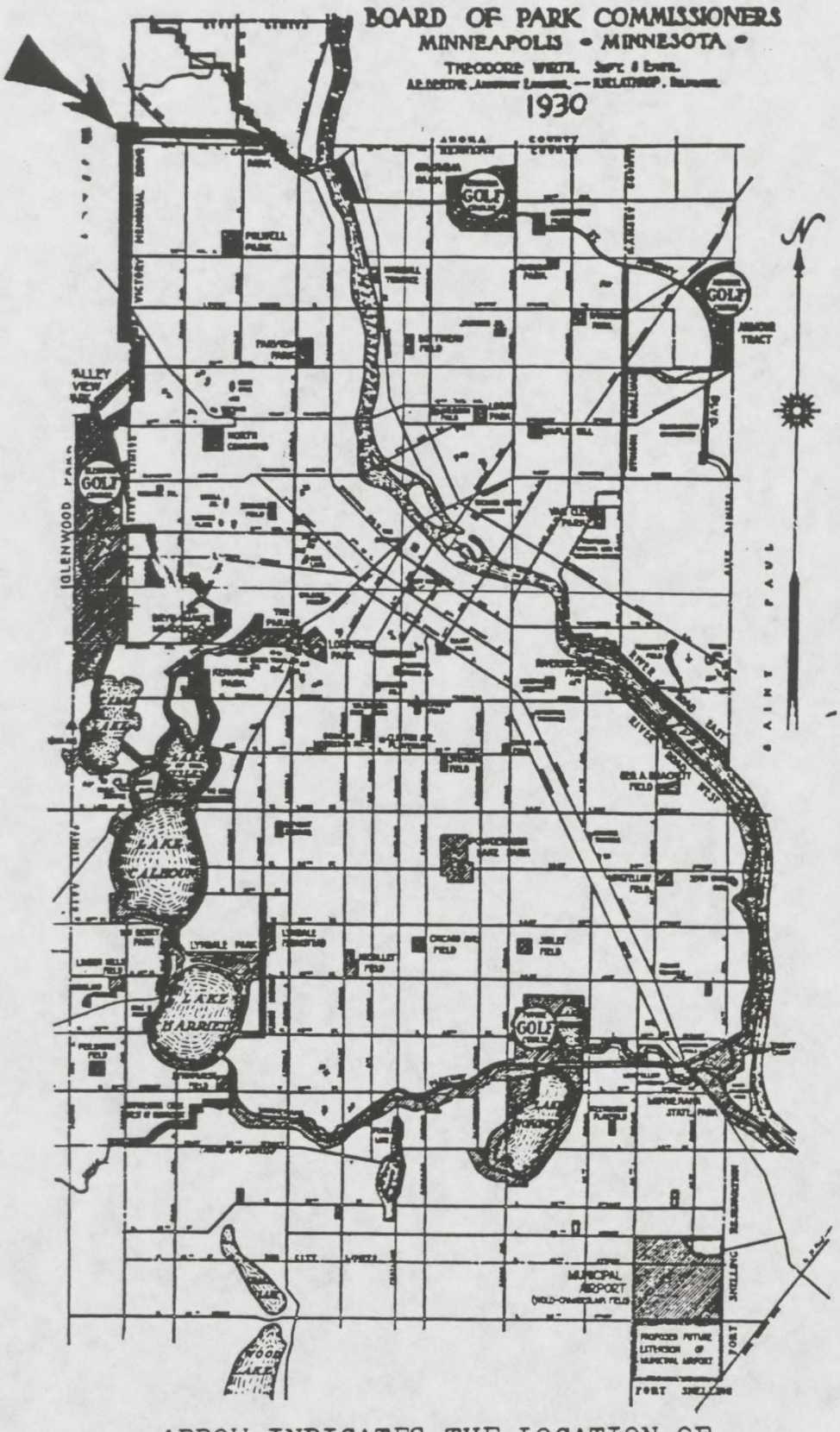
FIGURES

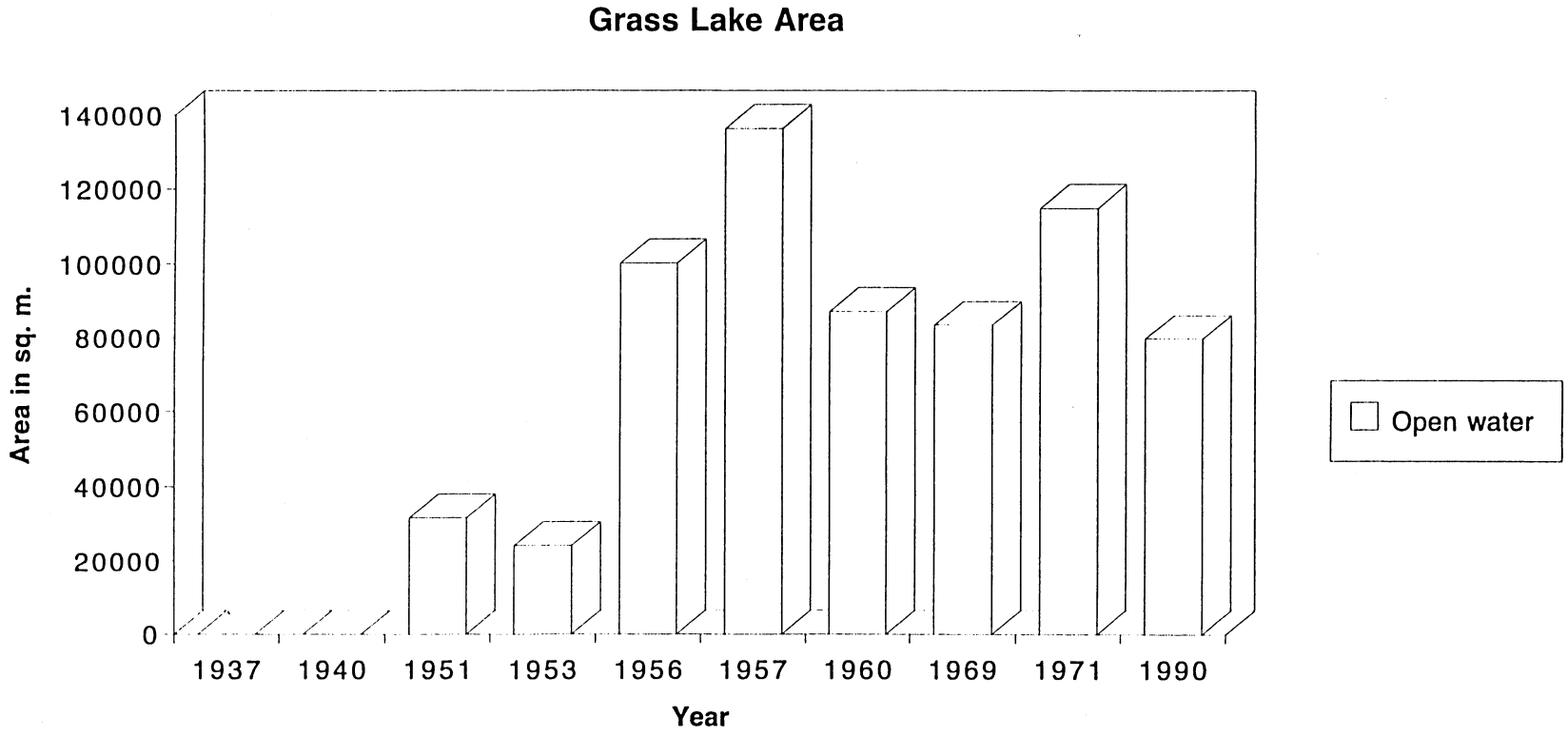
MAP OF THE FORT SNELLING MILITARY RESERVATION

SURVEYED BY LIEUTENANT JAMES L. THOMPSON IN 1839.

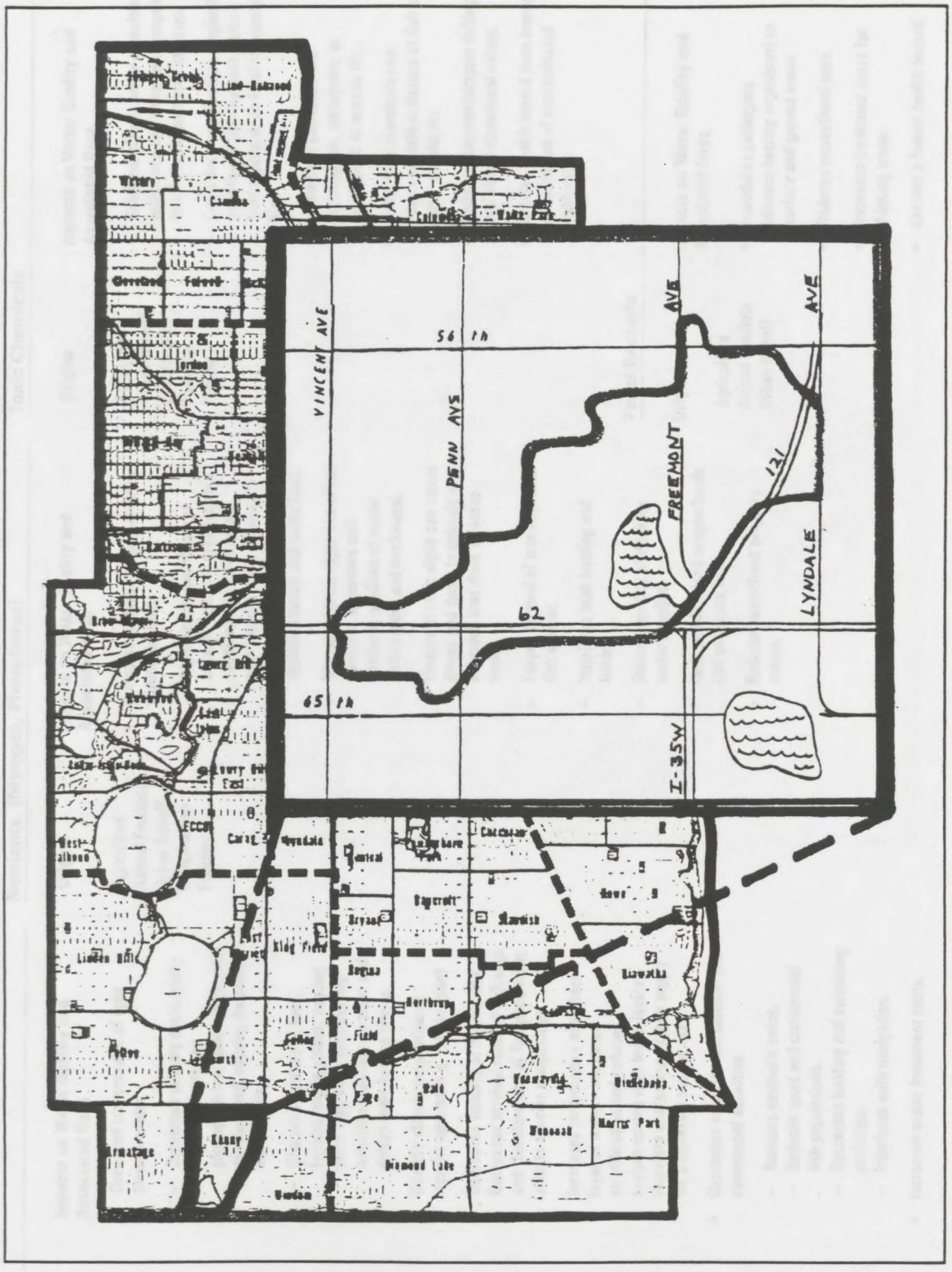




ARROW INDICATES THE LOCATION OF
THE LINCOLN MONUMENT


Grass Lake Area
140000
120000
100000
80000
60000
40000
20000
0
Area in sq. m.
1937
1940
1951
1953
1956
1957
1960
1969
1971
1990
Year
Open water

Grass Lake Sub-Watershed



Nonpoint Source Pollutants — How Do They Affect Water Quality?

Sediment

Origins

Agriculture
Urban Runoff
Construction
Mining
Forestry

Impacts on Water Quality and Associated Uses

- Deceased transmission of light through water.
  - Decreases primary productivity (aquatic plants and phytoplankton) upon which other species feed, causing decrease in food supply.
  - Obscures sources of food, habitat, hiding places, nesting sites; interferes with mating activities that rely on sight and delays reproductive timing.
- Directly affects respiration of aquatic species (e.g. gill abrasion)
- Decreases viability of aquatic life. Decreases survival rates of fish eggs and therefore size of fish population; affects species composition.
- Increases temperature of surface layer of water—increases stratification and reduces oxygen-mixing with lower layers, therefore decreasing oxygen supply for supporting aquatic life.
- Decreases value for recreational and commercial activities.
  - Reduces aesthetic value.
  - Reduces sport and commercial fish populations.
  - Decreases boating and swimming activities.
  - Interferes with navigation.
- Increases water treatment costs.

Nutrients. (Nitrogen, Phosphorus)

Origins

Agriculture
Animal Feedlots
Urban Runoff
Construction
Forestry

Impacts on Water Quality and Associated Uses

- Promotes premature aging of lakes (eutrophication)
  - Algal blooms and decay of organic materials create turbid conditions that eliminate submerged aquatic vegetation and destroy habitat and food for aquatic animals and waterfowl.
  - Blooms of toxic algae can affect health of swimmers and aesthetic qualities of water bodies (odor and murkiness).
  - Blooms of toxic algae can cause illness and death in animals and livestock that drink affected water.
  - Favors survival of less desirable fish species.
  - Interferes with boating and fishing.
  - Reduces quality of drinking water supplies.
  - Reduced dissolved-oxygen levels can suffocate fish.
  - Reduces waterfront property values.

Toxic Chemicals

Origins

Agriculture
Urban Runoff
Construction
Forestry
Mining

Impacts on Water Quality and Associated Uses

- Sublethal effects lower organism's resistance and increase susceptibility to other environmental stresses.
- Can affect reproduction, respiration, growth and development, reduce food supply, or be fatal to aquatic life.
- Some toxic chemicals are carcinogenic, mutagenic, or teratogenic to aquatic life.
- Some toxic chemicals can bioaccumulate in tissues of fish and other aquatic life.
- Reduces commercial/sport fishing and other recreational values.
- Creates health hazard from human consumption of contaminated fish/water.

Fecal Bacteria

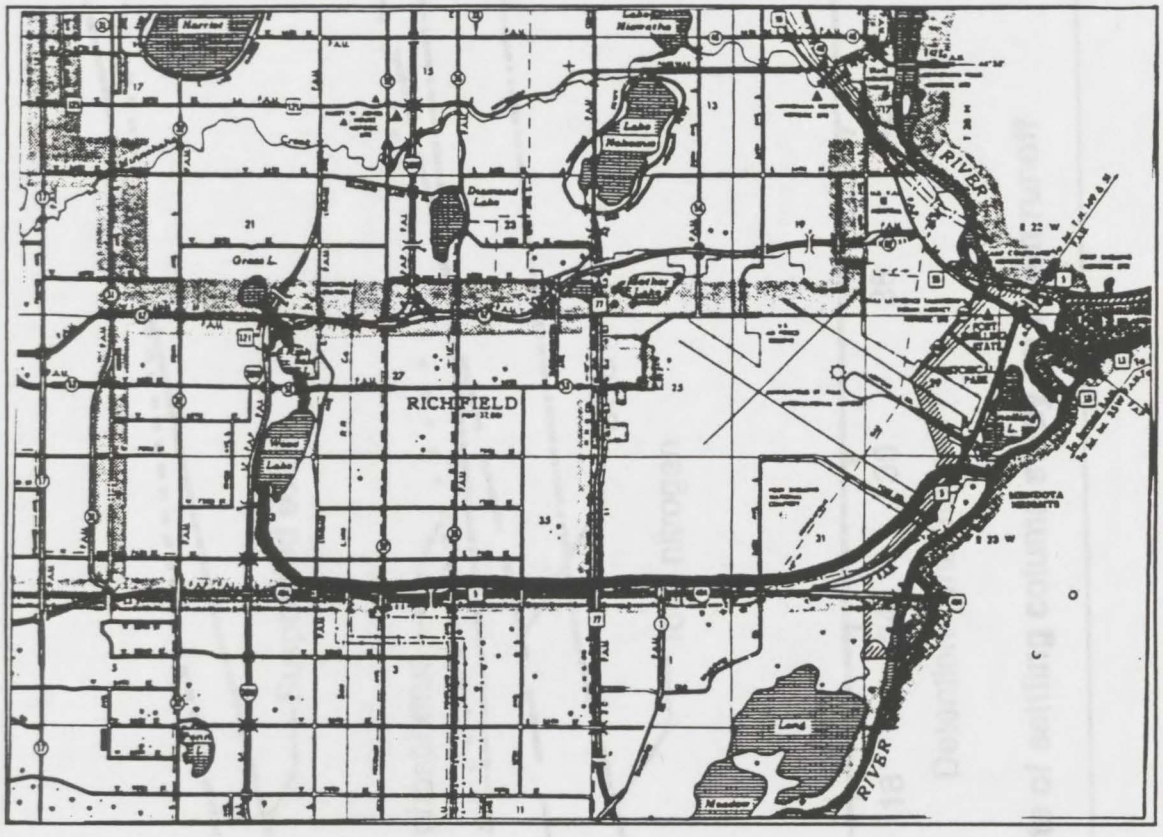
Origins

Agriculture
Animal Feedlots
Urban Runoff

Impacts on Water Quality and Associated Uses

- Introduces pathogens (disease-bearing organisms) to surface and ground water
- Reduces recreational uses.
- Increases treatment costs for drinking water.
- Creates a human health hazard.

Grass/Richfeild/Wood Lakes Pipeline



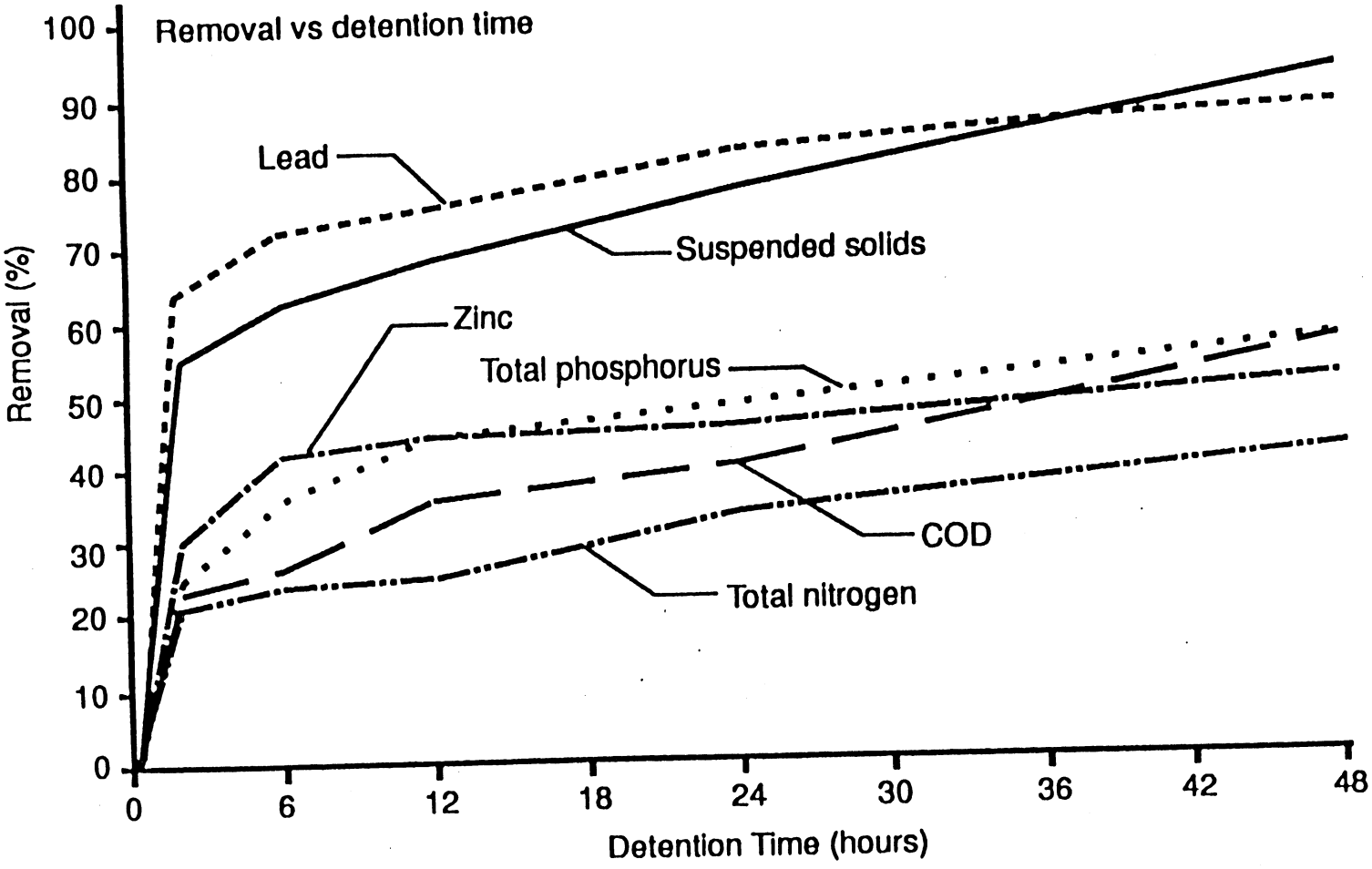


Figure 4.2-1: Results of settling column study on urban runoff

ATTACHMENT C